Writing Your Oxy CS Comps Paper in LaTeX

Justin Li
justinnhli@oxy.edu
Occidental College

Abstract

This document serves as an introduction to LaTeX and also describes the requirements of the senior project final paper for Occidental College's Computer Science majors. We start by justifying the use of LaTeX over Word, Google Docs, and other What-You-See-Is-What-You-Get (WYSISYG) editors. A brief tutorial to LaTeX follows, reviewing the most common commands used in paper writing. We then turn our attention to the Oxy CS Comps Paper, first contextualizing it within the major curriculum, before exploring each major section of the paper in detail. We conclude with some miscellaneous tips for successfully completing comps.

1 Introduction

2 Using LaTeX

LaTeX (pronounced *lah-teck* or *lay-teck*), often stylized as LaTeX and written as latex, is a document markup language and typesetting system. Building on the TeX language created by Donald Knuth in 1978, LaTeX provides additional commands for common document needs such as sections, figures, and bibliograhpies. LaTeX is widely used in academia, especially in mathematical fields, due to how easy it is to write mathematical equations and its automatic management of references. Since it is a markup language, LaTeX source files are written in plain text, which also makes it compatible with version control systems like git.

The most primitive syntax of LaTeX is the *macro* or *command*, which is always written with a backslash followed by the name of the command. The LaTeX glyph, for example, can be created with the command `\LaTeX`. Some commands take parameters, which are denoted in braces (e.g., `\usepackage{biblatex}` will import the `biblatex` package), with some commands additionally accepting options in square brackets (e.g., `\usepackage[style=numeric]{biblatex}`). The `\begin` and `\end` commands are special, as they indicate the start of an *environment*. The content of LaTeX documents, for example, are surrounded by

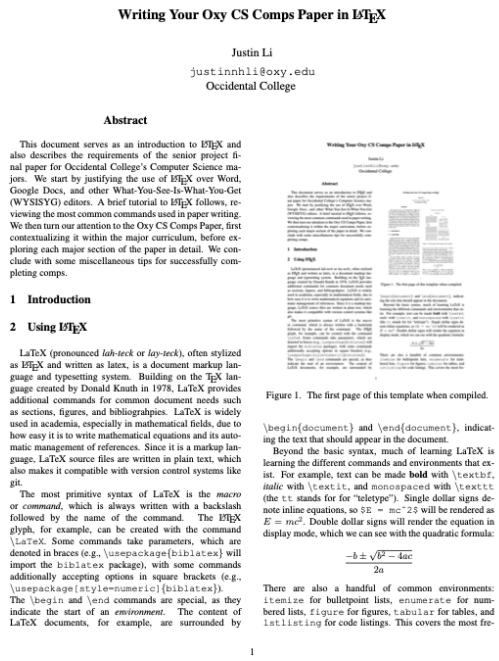

Figure 1. The first page of this template when compiled.

`\begin{document}` and `\end{document}`, indicating the text that should appear in the document.

Beyond the basic syntax, much of learning LaTeX is learning the different commands and environments that exist. For example, text can be made **bold** with `\textbf`, *italic* with `\textit`, and `monospaced` with `\texttt` (the `tt` stands for for "teletype"). Single dollar signs denote inline equations, so `$E = mc^2$` will be rendered as $E = mc^2$. Double dollar signs will render the equation in display mode, which we can see with the quadratic formula:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

There are also a handful of common environments: `itemize` for bulletpoint lists, `enumerate` for numbered lists, `figure` for figures, `tabular` for tables, and `lstlisting` for code listings. This covers the most frequently used commands, but as you

might have already inferred, LaTeX is a vast and deep system, and can easily be overwhelming. We recommended following the **Overleaf2021LearnLaTeXIn** tutorial [**Overleaf2021LearnLaTeXIn**], and examining and playing with the source of this document, to gain working proficiency with LaTeX.

One final note on writing in LaTeX. Since LaTeX is only a markup language, the source files must be compiled into a viewable form, most commonly into a PDF file. The source of this document is made up of several files, each with its own purpose:

- `template.tex` - The main LaTeX file containing the contents of the document.
- `oxycomps.sty` - A style file with settings for what the document should look like.
- `references.bib` - A list of bibliography items.
- Other files containing images, build instructions, etc.

Manual compilation of these files is somewhat esoteric, as it requires multiple uses of the `pdflatex` and `biblatex` commands. Instead, it is much easier to use tools such as `latexmk` (in the terminal) or Overleaf (online) for compilation. We have also provided a `Makefile` which will automatically update the document as necessary; the use of makefiles is beyond the scope of this document, but see **Lambert2021MakefileTutorial**.